

Garelick Farms Lynn
Industrial Wastewater Pretreatment System (IWPS)

The Plant produces an assortment of dairy and juice products. The wastewaters from this manufacturing process are collected in three site sewer systems; (1) the Dirty Wastewater sewer, (2) the Clean Wastewater Sewer, and (3) the Slop Tanker.

Return product and off-spec product are crushed in a compactor. The liquid product is discharged to a sump and pumped to a “dirty wastewater sewer” line or to a 5,000-gallon “slop tanker.” The contents of this tanker can either be shipped for off-site disposal or can be added to the “dirty wastewater sewer”.

The “Dirty Wastewater” collects all material from production floor drains, Processing Unit drains, Sanitizing, and CIP waters.

The “clean wastewater” collects utility waters and diluted sanitizer and CIP wash waters.

The “dirty water” discharges to a wet well where it is collected and pumped through a rotary screen to remove plastic caps and other debris. A level sensor controls the pumps. The screened wastewater discharges to a small mixed equalization basin (EQ1). It is pumped from this basin based on a level control to a large, covered, mixed, aboveground equalization tank (EQ2). Wastewater is pumped from this equalization tank at a manually set rate to the downstream anaerobic treatment system. The rate is set to provide reasonably consistent COD, and flow loading. The feed, and discharge pump for this tank will shut off if a “high level” or “low level” is reached, respectfully.

The anaerobic treatment system consists of a large, covered, completely mixed basin (the Reactor) followed by a de-gasification tower followed by a center-feed, peripheral takeoff clarifier. Together this system is known as the “anaerobic contact process” and is essentially the “the anaerobic equivalent of the activated sludge process”. Caustic is added continuously to the anaerobic basin to maintain a minimum bicarbonate alkalinity of 1000 mg/L and minimum pH of 6.7 s.u. Ferric chloride is added in three locations on occasion. It is added (on occasion) continuously to the wet well upstream of primary equalization to serve as a

catalyst for degradation of one of the sanitizing agents present in the wastewater (peroxyacetic acid). The catalyst is actually the ferrous ion (Fe^{++}), which the ferric ion (Fe^{+++}) is reduced under oxygen-starved conditions that exist in the secondary equalization basin. It is also added, on occasion, continuously along with polymer and/or defoamer to the mixed liquor between the de-gas tower influent and effluent to aid in sludge settling and effluent TSS control. Lastly, it is added daily as a batch dose to the Reactor to control sulfide emissions from the open-topped degasification tower and open-topped clarifier and to provide a needed micronutrient. Cobalt chloride is also added daily as batch addition to the Reactor as a micronutrient. Batch addition is used to allow the metals to be used as micronutrients prior to their being precipitated or complexed. Defoamer is added continuously to the Reactor feed as needed to keep the surface of the mixer ports predominately free of surface scum.

Gas generated from the conversion of chemical oxygen demand (COD) to methane is collected underneath the anaerobic basin cover and routed to be burned by a boiler and/or a flare. The hot water discharged from the boiler is passed through a heat exchanger that is used to warm an external re-circulation stream within the anaerobic reactor. Manufacturing plant supplied Non-contact cooling water, before discharging to a cooling tower, is passed through another heat exchanger to warm the return sludge from the clarifier. Together, these heating devices keep the contents of the anaerobic basin operating at a minimum year-round temperature of 90 degrees Fahrenheit.

Effluent and skimming's from the clarifier discharge to the "Anaerobic Contact Process Effluent Lift Station" where it is pumped to the Effluent Equalization basin and combines with the "clean water sewer" discharge. Sludge settled in the clarifier, is pumped through a heat exchanger and into the reactor, by the "RAS" pump. Intermittently sludge is wasted from the clarifier underflow line at a nominal rate to the effluent equalization basin. The contents of the effluent equalization basin, discharges by gravity through an effluent flume and monitoring station.

A IWPS Layout sketch (Figure 1) and a block flow diagram (Figure 2) and Bio-Gas P&ID of the onsite IWPS are attached.

